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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/597,937	09/27/2006	Nobuto Terada	WAKAB98.001APC	8123

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EXAMINER	
ARNBERG, MEGAN C	

ART UNIT	PAPER NUMBER
1796	

NOTIFICATION DATE	DELIVERY MODE
02/11/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/597,937	TERADA ET AL.	
	Examiner	Art Unit	
	MEGAN ARNBERG	1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 June 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☒ Claim(s) *10-12* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *06/15/2007; 08/11/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claims 10-12 are objected to because of the following informalities: In claim 10 there is a typographical error. "Cupper" in the second to last line should be "copper". Likewise in claim 11 there is a typographical error. "Ultifunctional" in the second to last line should be "multifunctional". Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The terms "like" in claims 1 and 6, 4th line from the bottom and "type" in claims 1 and 6, last line and claim 12, second from last line are relative terms which render the claim indefinite. The terms "like" and “type” are not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. See MPEP 2173.05(b).

Regarding claim 1: It is unclear what is meant by the word "only" in the second line and the 9th line. It could mean that the composition comprises only the one-

component epoxy thermosetting resin; however if this is the case, the words "consisting of" should be used to indicate the composition excludes all other compounds. This appears to not be the case in the instant claim 1 since other components are listed as essential limitations. Clarification is necessary. For the purpose of further examination, the composition is taken to *comprise* all listed elements, as evidenced by the written description.

The words in parentheses in line 19 of claim 1 also render the claim unclear. It is not apparent if the words in parentheses are excluded from the claim or are essential elements. Correction is required; the parentheses should be removed.

In the 3rd line from the bottom, the polycyclic structure having cross-link chains on the ring is unclear. The “cross-link chains” could mean that the molecules used as a curing agent are crosslinked to other like molecules. If this is the case, it is unclear how this constitutes a “molecule as a curing agent” from line 14 and there is no support for how one of ordinary skill in the art would crosslink the cyclic acid anhydride molecules. However, as evidenced by the written description, particularly Chemical Formulas 2 and 3, this phrase is taken to mean a polycyclic structure having a bridge on the ring.

Regarding claim 4: Claim 4 recites the limitation "bifunctional epoxy compound containing a naphthalene skeleton" in the 3rd and 4th lines. There is insufficient antecedent basis for this limitation in the claim. For the purpose of further examination, it is taken to mean the composition further comprises a bifunctional epoxy compound containing a naphthalene skeleton.

Claim Rejections - 35 USC § 103

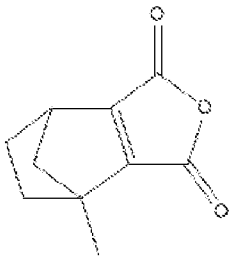
The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 3-7, and 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over DiSalvo et al. (U.S. Pat. 4,557,860) when taken with Pham et al. (Epoxy Resin Article).

Regarding claims 1 and 6: DiSalvo et al. teaches a conductive adhesive (col. 3 lines 43-57) comprising a conductive metal powder, specifically silver (example 8). Since in example 8 only silver powder/flake is used, there is 100% silver by volume. Also disclosed is the epoxy resin of the reaction of bisphenol A and epichlorohydrin (col. 1 lines 49-63) which is a liquid epoxy resin, as evidenced by Pham et al. (pages 685-686). Diglycidyl ether of bisphenol A also an epoxy resin component containing at least

a multifunctional epoxy compound having a polycyclic aromatic ring skeleton as a main component (Pham et al. see figure on page 686). DiSalvo et al. further teaches methylbicyclo (2,2,1)heptene-2,3 dicarboxylic anhydride (col. 3 lines 25-30), which has the formula:  . This is a cyclic acid anhydride having an acid anhydride moiety constituting a ring structure and having another hydrocarbon ring skeleton fused with the ring structure constituted by the acid anhydride moiety, in which the other hydrocarbon ring skeleton that is fused with the ring structure constituted by the acid anhydride moiety is a polycyclic structure having a bridge on the ring, and the total number of carbon atoms composing the structure of the other hydrocarbon ring skeleton including the bridge is 8 and the ring structure of the acid anhydride moiety is a 5-member ring. The metal powder/flakes are dispersed in the adhesive, as DiSalvo et al. states that a homogenous solution is mixed (example 8).

While the ratio of 0.7 to 1.1 equivalents of the cyclic acid anhydride with respect to the epoxy equivalent of the epoxy resin component and a content ratio of the metal powder to the binder resin component in a range between 34:66 and 55:35 are not disclosed, the experimental modification of this prior art in order to ascertain optimum operating conditions fails to render applicants' claims patentable in the absence of unexpected results. See *In re Aller* and MPEP 2144.05. At the time of the invention a person having ordinary skill in the art would have found it obvious to optimize the curing

agent to epoxy equivalent ratio and would have been motivated to do so for such desirable properties as a completely cured resin with adhesive properties but without unreacted starting component impurities. At the time of the invention a person having ordinary skill in the art would have found it obvious to optimize the amount of silver loading and would have been motivated to do so for such desirable properties as a composition that is sufficiently conductive as well as adhesive. A prima facie case of obviousness may be rebutted, however, where the results of the optimizing variable, which is known to be result-effective, are unexpectedly good. See *In re Boesch and Slaney*, 205 USPQ 215.

Regarding claims 3 and 4: DiSalvo et al. teaches as the epoxy resin glycidyl polyether of bis(2-dihydroxynaphtyl)methane (col. 1 lies 49-57), which is a dihydroxynaphthalene diglycidyl ether and a bifunctional epoxy compound containing a naphthalene skeleton and diglycidyl ether of bisphenol A (col. 1 lines 49-55) which is an epoxy resin component containing at least a multifunctional epoxy compound having a polycyclic aromatic ring skeleton as a main component.

Regarding claim 5: DiSalvo et al. discloses using an imidazole, which is a known epoxy resin curing accelerator in combination with the anhydride (example 8).

Regarding claims 7 and 11: While DiSalvo et al. does not teach that the ratio of the multifunctional epoxy compound having another ring structure in the skeleton to the multifunctional epoxy compound having the polycyclic aromatic ring skeleton is 5:100-50:100 or 5:95-30:70, this is a result effective variable which can be optimized. At the time of the invention a person having ordinary skill in the art would have found it obvious

to optimize the ratio and would have been motivated to do so for such desirable properties as sufficient adhesiveness and flexibility.

Regarding claims 9 and 10: DiSalvo et al. teaches using 100% silver powder/flake in example 8, therefore the metal powder is not a mixed metal powder.

Regarding claim 12: DiSalvo et al. discloses the epoxy resin of the reaction of bisphenol A and epichlorohydrin (col. 1 lines 49-63) which is a liquid epoxy resin, as evidenced by Pham et al. (pages 685-686). Diglycidyl ether of bisphenol A also an epoxy resin component containing at least a multifunctional epoxy compound having a polycyclic aromatic ring skeleton as a main component (Pham et al. see figure on page 686).

Claims 2, 8 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over DiSalvo et al. (U.S. Pat. 4,557,860) when taken with Pham et al. (Epoxy Resin Article) as applied to claim 1 above and in view of Kuboki et al. (U.S. Pat. 6,420,464).

Regarding claims 2 and 8: DiSalvo et al. discloses the basic claimed composition as set forth above. Not disclosed is a silane coupling agent. However, Kuboki et al. discloses a similar composition with a glycidyl ether of bisphenol (col. 7 lines 20-25), methylnadic anhydride/methylbicyclo heptene dicarboxylic anhydride (col. 7 lines 1-10) and a silane coupling agent (col. 8 lines 35-48). DiSalvo et al. and Kuboki et al. are combinable because they are both concerned with the same field of endeavor, namely adhesive compositions for electronic parts. At the time of the invention a person having ordinary skill in the art would have found it obvious to combine the silane

coupling agent of Kuboki et al. with the composition of DiSalvo et al. and would have been motivated to do so for such desirable properties as bonding inorganic materials such as metal fillers to organic resins.

Regarding claim 13: DiSalvo et al. teaches as the epoxy resin glycidyl polyether of bis(2-dihydroxynaphtyl)methane (col. 1 lies 49-57), which is a dihydroxynaphthalene diglycidyl ether.

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MEGAN ARNBERG whose telephone number is (571)270-3292. The examiner can normally be reached on Monday - Friday 7:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Eashoo can be reached on (571) 272-1197. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark Eashoo/
Supervisory Patent Examiner, Art Unit 1796

Megan Arnberg
January 30, 2008